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Edgar F. Cynait



THE ELEMENTS
OF
GYMNASTICS,
FOR BOYS,
AND OF
CALISTHENICS,
FOR YOUNG LADIES.

ILLUSTRATED BY FORTY-THREE ENGRAVINGS.

By GUSTAVUS HAMILTON,
PROFESSOR OF GYMNASTICS.

New Edition.

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A GYMNASTIC EXERCISE GROUND.

PREFACE.

VIGOROUS exercise has always been justly recommended to youth as conducive to health, strength, and growth; but it was reserved for our age to reduce such exercises to a system of practice, which combines grace of action with agility of movements. For this improvement we are indebted to the Germans, Danes, and Swiss. Salzmann published a treatise on Gymnastics, as long as forty years since, but the modern English work of CAPT. CLIAS conferred on the subject entirely new features.

The study has since been, very properly, adopted in our Universities and public establishments. Many foreign professors have appeared in London, and there are several public schools for instruction and practice. Nothing, therefore, seemed to be wanted in order to engraft these exercises on the general education of the entire rising generation in England, but a convenient, cheap, and perfect display of the system, in a small volume like the present.

The plan of the Author includes the entire course usually taught to boys, to which the term GYMNASTIC has been applied, because, in the wrestling and racing matches of the Greeks, at the public games, the competitors were usually stript; and Gymnastic exercises are so termed from the Greek,

γυμνος, NAKED, because, among the Greeks, they were always performed naked.

The ingenuity of professors having adapted an analogous course to the habits and manners of females, and the same being now adopted in the principal Ladies' Seminaries in and round London, the Author, mindful of his duty to the public, has introduced as much of the Female Course as is usually practised. These Exercises are called CALISTHENIC, from the Greek words *καλος*, BEAUTY, and *σθενος*, STRENGTH, being the union of both.

To the taste and skill of Mr. R. SEYMOUR, as draughtsman and engraver, the Author acknowledges much of the perfection of the work. His own object was utility, and this result

he has endeavoured to obtain by method, precision, and comprehensiveness, leaving it to the tutor, or parent, to exclude any practice which may be thought more hazardous than important or necessary.

London, Jan. 31, 1827.

THE ELEMENTS OF GYMNASTICS.

GYMNASTIC exercises, in their broadest signification, include every vigorous exertion of the muscles and limbs, such as WALKING, DANCING, BALANCING, RUNNING, JUMPING, VAULTING, CLIMBING, WRESTLING, RIDING, and SWIMMING.

But the Scholastic course usually includes only WALKING, BALANCING, RUNNING, JUMPING, VAULTING, and CLIMBING; and to these the following pages are dedicated.

DANCING is in other hands; WRESTLING is dangerous; and RIDING and SWIMMING are often inconvenient,

however desirable. This limited course, however, includes the others in effect; for those, who are expert in these exercises, will dance and ride more gracefully, and will acquire that presence of mind which is the chief quality of good swimmers.

The utility of exercising the muscles, and the wonderful precision which may, by exercise, be conferred on them, are evident from the powers acquired by the muscles of the fingers in playing stringed instruments, and of the hands and fingers in playing the piano forte; and it appears that all the muscles are susceptible of equal perfection, by suitable exercises and continued practice.

PREPARATIVES.

A moderately spacious play-ground is requisite, and an outhouse or covered building to protect the apparatus from wet.

A leaping stand.

An horizontal bar.

Parallel bars.

A vaulting horse.

A climbing stand, with its appurtenances of wooden and rope ladders, ropes, poles, &c.

The whole, according to extent, will cost from ten to fifteen pounds.

For Ladies' Calisthenics, the cost will not amount to three pounds.

CAUTIONS.

The Exercises should be performed before dinner, not soon after a meal.

Boys should not be allowed to carry knives, or peg tops, or toys, in their pockets.

Exercises which exhaust delicate boys should be avoided, or conducted with special attention ; therefore it is well to divide them into classes, according to their strength and height.

Pupils should not be allowed to attempt difficult things till they are very expert in easy ones.

To guard against falls in the climbing and vaulting exercises, the ground should be strewed with straw or sand.

The whole should proceed under the eye of a master or usher.

Extra clothes should be resumed as soon as the exercises are over; and none of the pupils should be permitted, while warm, to lie on the ground, sit in a draught of wind, or drink cold water or wash themselves with it.

WALKING AND STANDING.

The power of walking is increased by progressive exercise. Thus, if we persevere in walking 5 miles a day for a week, we may, in a second week, with no greater fatigue, walk 8 miles, —then 12, 15, 20, 25, and 30, or even to 40 or 50 miles, a day.

Walking and bodily exercises, in general, distribute the heat concentrated at the lungs, promote the circulation, and increase the secretions and perspiration.

A moderate pace is 3 miles an hour, a brisk pace $3\frac{1}{2}$ miles, and a quick one 4 miles. Long walks are best performed at from 3 to $3\frac{1}{2}$ miles an hour.

In starting to walk, the head and body should be erect, the stomach held in, the shoulders back, the knees

straight, and the toes turned out. The arms should move freely by the side, the feet be kept parallel with the ground, and the body rested on the ball of the foot, not on the toes or heels.

The times in walking are, the ordinary or slow step; the double step, twice as fast; and the triple step; all of which should be constantly practised. Walking on tip-toe, and on the heels, are, also, good preparatory exercises.

The school step is performed by raising one foot in front, the knee and instep straight, and the toe bent to the ground, and repeating the same slowly with the other foot—an action which should be continued till the general style of walking is improved.

The pace, “one, two, three,” consists

in advancing the foot, placing the heel first, *one* ; then the toe, raising the heel, *two* ; and then the heel down, *three*. In going backward, the motions are reversed ; and in this, and all exercises, we should begin in slow time, become perfect, and then proceed, in quick time, till perfect.

All exercises in walking, stepping, balancing, &c. should, in schools, be performed in classes, and no one advanced to a higher class till he is perfect in the previous exercises.

RUNNING.

This is a valuable athletic exercise, when judiciously regulated.

To succeed, it should be quietly performed, and the energies of the system confined to the legs, which should not be raised too high. The body should lean forward, the respiration should be restrained, and the distances increased with the facility. The arms should be nearly still, and no opposition given to the air by clothes, or useless motions.

Running in a square and in a circle may be advantageously practised, changing the direction so as to exercise both sides in equal perfection.

Running against time, and shortening the time as facility increases, is a useful practice.

A mile in five minutes, or 350 yards in a minute, is good running ; but some swift runners will perform a quarter of a mile, or 440 yards, in a minute.

JUMPING.

The Exercises preparatory to jumping, and those which bring the requisite muscles into energy and activity, are,

1. To hop with each leg.
2. To walk and spring on the toes, in slow and quick time.
3. To raise the legs, alternately before, so that the knee be level with the shoulder.
4. To raise first one and then both, so as to kick the thighs behind.

The rules in jumping are,

1. To direct the arms towards the place with a swing from behind.
2. To fall on the toes and never on the heels.
3. To bend the knees, so as to bring

the calves of the legs to the thighs, or the knees on a level with the hips.

4. To break the fall with the hands.

5. To hold the breath while in motion.

6. To keep the body forward, so as not to fall backward.

7. To cause both feet to fall together.

8. To run to the leap with short steps of increasing velocity.

Boys should begin with leaps of four or five feet, and, when expert at these, they may extend them to 8 or 10 feet; and, in height, they should begin with 2 feet, till they can leap nearly as high as themselves.

Plate I.



Preliminary exercises for leaping.

LEAPING OR JUMPING.

PRELIMINARIES.

The hop walk : the hands are placed upon the hips and the thumb turned back in the manner represented, *Plate I. fig. 1*. The performer then steps forward on the balls of the toes ; this may be increased in quickness, bending the knees as little as possible.

HOPPING.

Plate I. fig. 2. The arms to be placed as directed above ; the knees stiff ; the breast forward ; one foot raised up ; the other bent down upon the toes, of which the hop is made by a quick succession of small springs.

STOOPING ON THE TOES.

Plate I. fig. 3. The body is bent

down in a crouching posture, supported on the toes, and in this position makes a succession of small springs from the ground, without altering the place, or removing from the spot.

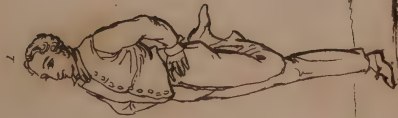
THROWING THE FEET UP BEHIND.

Plate II. fig. 1. The hands on the hips; the body is then raised upon the toes, and the feet are flung up alternately behind, so as to strike the thighs; it is afterwards performed with both feet together.

SPRINGING THE KNEES UP.

Plate II. fig. 2. For this action, the legs are kept close and a spring is made raising the knees up to the breast, the head and shoulders should be kept upright, the body should bend a little forward.

Plate II.



Preliminary exercises for-leaping.

Plate III.



The long-leap.

THE LONG LEAP.

A trench is to be made in the ground, gradually widening from one end to the other. The pupils then follow each other in succession over the same, gradually taking the wider part as they become more and more capable. This leap is first performed without the run; and for this action the feet should be closed, and the spring be made from the toes; the arms are thrown forward and the body in descending should incline rather forward.

In the long leap with the run, as in *Plate III.*, the run should be from ten to twenty paces, and be made in quick small steps: the spring is with one foot, which should be quickly drawn up to the other, and they should descend at the same instant; the arms are

to be stretched forth, and the body inclined forward.

THE HIGH LEAP WITH THE STAND.

Plate IV. The stand is composed of two upright posts bored through with holes; through two of which are to pass at any given height, pegs *a* and *b*; and across the projecting ends of these pegs is laid a line *d*; the sand bags *e f* keeping it straight; at the same time should the leaper touch the line, it instantly falls. This leap is performed first standing, and then with the run; the directions being the same as for the long leap.

THE DEEP LEAP.

Plate V. A flight of steps as shewn in the plate will admit of descending from progressive heights; the

Plate IV.



*The High-Leap, with
the Leaping Stand.*

Plate V.



The deep leap.

feet are to be closed together and the body stooped, so that the hands should first touch the ground and then the toes.

Such leaps from great heights affect the brain, if the leap is on the heels instead of the toes; and this effect can only be secured by constant progressive exercises from 3 to 4, 5, and, ultimately, 10 or 12 feet.

PARALLEL BARS.

PRELIMINARY EXERCISES.

The hands are clenched, the thumb inside ; the arms are then by a sudden motion projected forward, the backs of the hands coming together. See *Plate VI. fig. 1.* The hands are then thrown behind, so that if possible the knuckles may touch ; next, the arms are extended sideways, the knuckles behind : then, suddenly, the hands are to be brought against the shoulders.

Plate VI. fig. 2. and 3. The arms are to be extended above the head, so as to touch at the knuckles, then quickly brought down to the sides, with the knuckles behind, and each of these motions are to be repeated for some time.

Plate IV.



Preliminary exercises for the parallel bars.



Plate VII.



First position on the parallel bars.

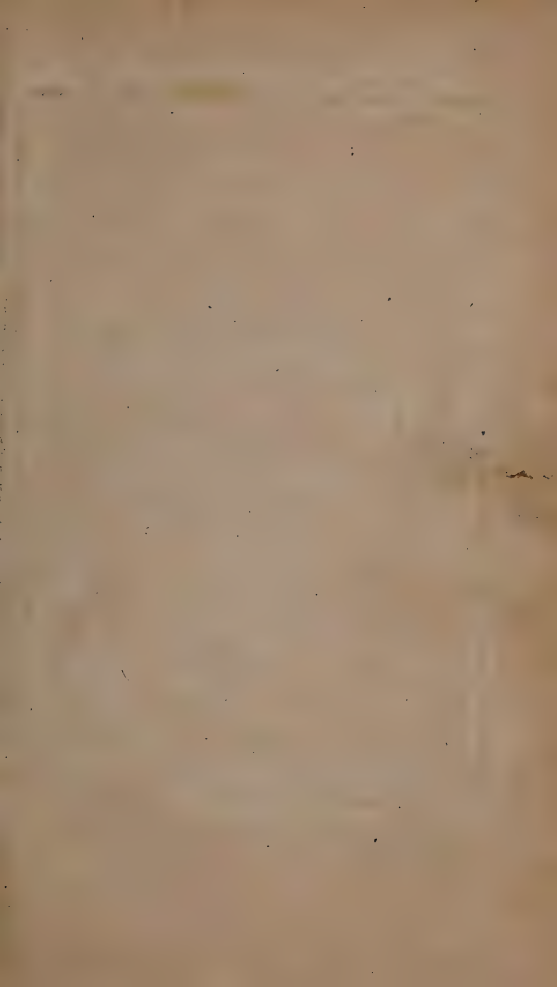
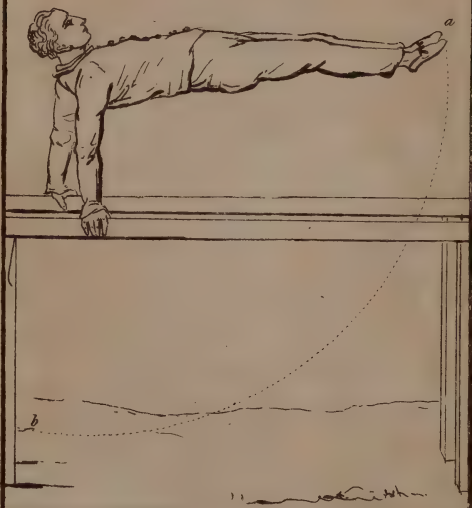


Plate VIII.



The Swing on the parallel bars.

POSITIONS ON THE PARALLEL BARS.

The first position is, to raise the body by the hands as shewn in *Plate VII.* Then to move from one end of the bars to the other, by moving the hands alternately, doing the same backward. The next effort is to move both hands at once: the legs should be kept close and straight.

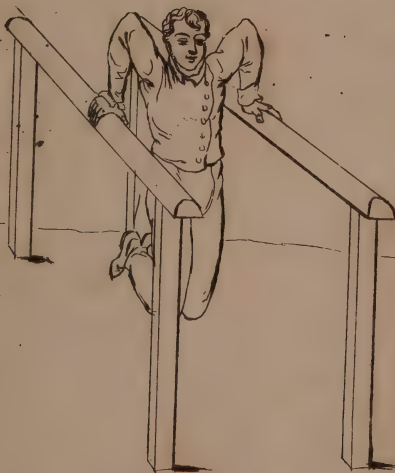
Plate VIII. shews the swing upon the bars; the body being supported by the arms; it is then swung by the shoulders, the feet describing the dotted arch *a b*, and rising equally high behind and before. At the third time of reaching the position in the *Plate*, the body is thrown over the bar either to the right or left, the hand on the opposite side leaving its hold at the same instant; this must also be done backwards.

The next exercise is likewise from the position in *Plate VIII.* Bring the thighs upon one bar, then in the same manner on the other, afterwards going over the opposite bar, as described above.

TO LOWER THE BODY, BY BENDING
THE ELBOWS.

Plate IX. shews the manner of performing this movement : the arms are then gradually straightened—this may be repeated several times. The next exercise is when in the position of *Plate VII.*, the right elbow is lowered to the bar, then the left—then the right is lifted from the bar, and then the left, and the first position resumed. This movement may be repeated twice or thrice, accordingly as the pupil is capable.

Plate IX.



To touch the ground with the knees.

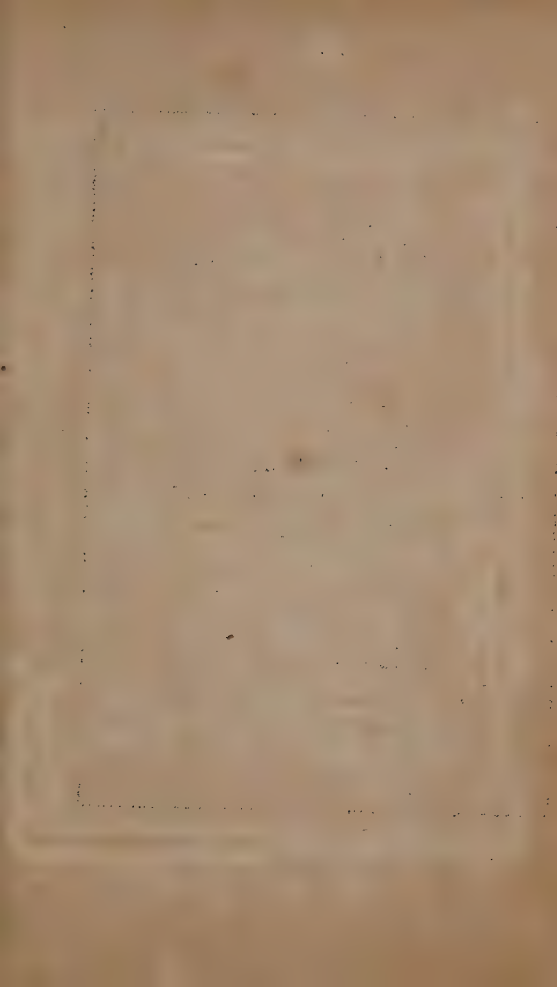


Plate I.





Plate XI.



Horizontal Bar.

HORIZONTAL BAR.

Plate X. fig. 1, shews the first position, which is the taking hold by the two hands of the side of the bar towards you and raising the body so as to look over the bar.

In *fig. 2*, the hands are placed nearly together on the further side of the bar, and the body is then raised.

In *fig. 3*, the hands are on each side the bar, and the body is then raised off from the ground and the pupil passes from one end of the bar to the other, by small springs of the hands along the bar; he afterwards does it by moving the hands alternately past each other. The legs are kept close.

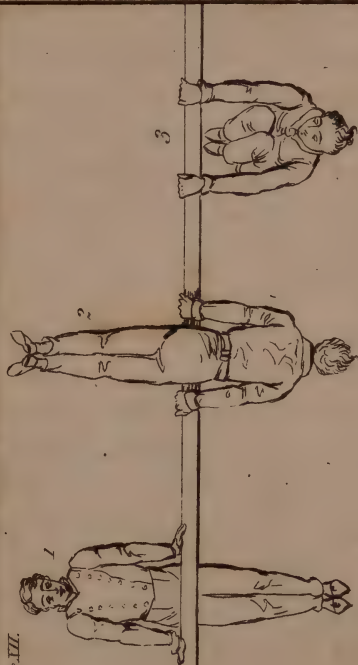
Plate XI. fig. 1. The feet are lifted so as to touch above the bar, they then sink down, as in *fig. 3*, in the pre-

ceding plate: this may be repeated several times. The next movement is, when in the above position, to pass along the bar by alternately moving one hand, and the feet may move in the same manner. If the pupil cannot accomplish this, he may slide his feet along the bar, as shewn in *fig. 1*, then let the right leg and arm be thrown over the bar, the left hanging, as in *fig. 2*. The left should then be thrown over the bar and the right hang loose; the body may then be supported by the right arm and left leg, and then by the left arm and right leg.

For another movement, take firm hold of the bar by the right hand, throw the right leg over the bar and hold it firm by the joint of the knee, raising the body and getting the bar under the left arm-pit.



Plate III.



An exertion of strength will then place you in a riding position on the bar. By taking firm hold of the bar with the hands while one leg is brought over the bar, the pupil finds himself in the position of *fig. 1, plate XII*.

He may then swing round the bar with the head downwards, as in *fig. 2*. The feet may come to the ground by the reverse way when in position *fig. 1*, except that the hands are to be on the reverse side of the bar, that is the knuckles in front ; the feet are swung twice or thrice backwards and forwards, and then forcibly thrown up in front, while the head sinks down backward.

The next movement is the taking hold of the bar with the two hands, and the feet are passed between them, as in *fig. 3*, they then come over until

they hang downward, when they may either return by the same way, or the pupil drops upon his toes to the ground.

Of course, a great variety of positions may be assumed on the bars when sufficiently expert; but boys should not be allowed to perform experiments of their own, which may be dangerous, or far from beneficial.

Plate XIII.



Preliminaries for Balancing.

BALANCING.

PRELIMINARY EXERCISES.

Balancing consists in standing upon one leg in various attitudes, as holding the raised foot high in the hand, stooping to make the raised knee touch the ground and recovering the original position, kissing the toe, &c.

One foot is raised in front, it is then laid hold of by one or both hands, and raised towards the chin, which is lowered towards it as in *Plate XIII. fig. 1.*

TO SIT DOWN.

One leg and both arms are stretched forward, the other leg is then gently bent, until the pupil sits down. He then rises up in the same manner; these exercises are to be performed with both legs till perfect.

THE BALANCING BAR.

This bar is round, about 60 feet long, and at one end is about twelve or fourteen inches thick, gradually getting smaller towards the other. It is supported in two places, in the manner shewn in *Plate XIV.* at the extremity of the thick end first and next at the centre, from whence to the thinnest end it becomes more and more difficult to perform, on account of its wavering up and down.

The pupils are first to walk along the bar with some assistance, then alone with the arms extended, and finally with the arms folded behind, as in *fig. 1, Plate XIV.*

When the learner can walk the bar well, he may try to pass various impediments on it; and then, instead of



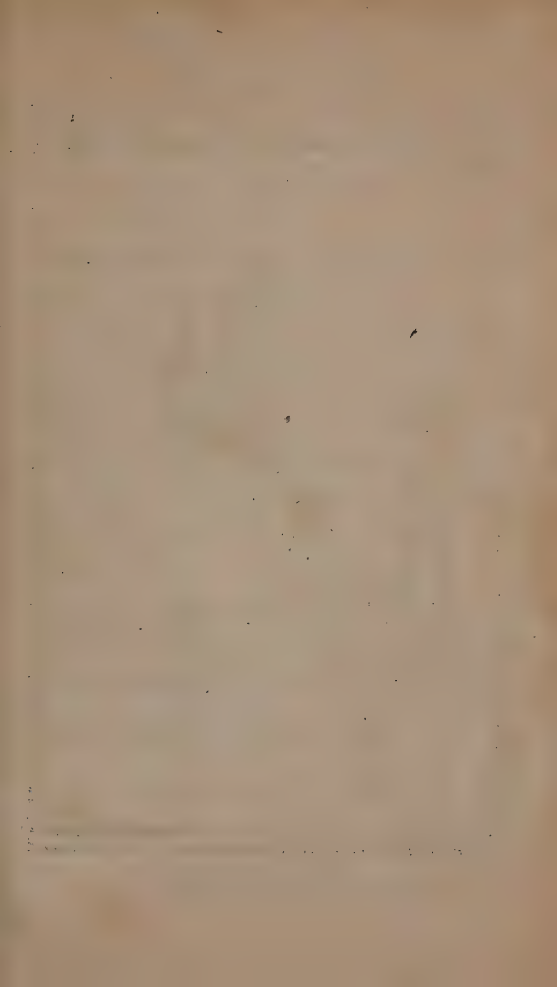
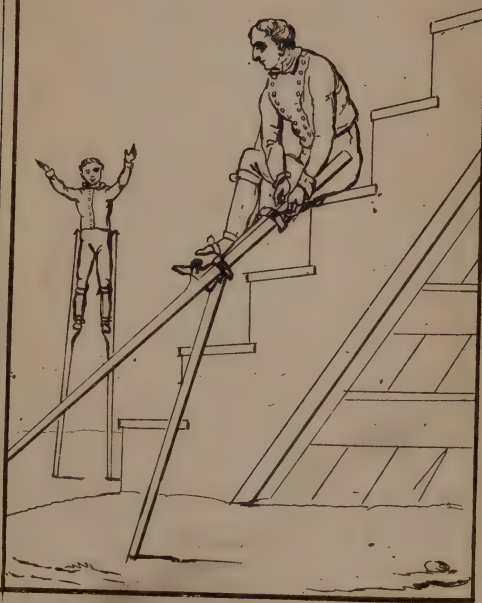


Plate XV.



Balancing.

jumping off at the small end, turn round on it and return to the other end, which may be practised at various parts of the bar.

The pupil is then to learn to walk backwards on the bar.

When two are to pass each other on the bar, they take hold of one another by the arms, as in *fig. 2, Plate XIV.* and counting one, two, three; at the word *one*, both advancing the right foot, and at *three* turning round each other.

All the preliminary exercises performed on the ground should then be repeated upon the bar, in order to acquire familiarity with it.

WALKING ON STILTS.

Plate XV. represents the use of elevated stilts, on which the French near

the Pyrenees make common use, and which have latterly been brought into England. They are a pleasing exercise in balancing, and may follow those on the balancing bars, and long pole. The engraving represents a boy getting into his stilts, and another at a distance, exulting in his elevation and security. Their long strides, actively exerted, enable those who use them to keep pace with a stage coach, and with little comparative fatigue.

LEAPING WITH THE POLE.

Plate XVI. Take hold of the pole about the height of the head with the right hand, and with the left about the height of the hips; place the pole to the ground, and at the same instant make a spring with the right foot, and the body passes by the left of the

Plate XVI.



The high leap with the Pole.

pole, the performer turning round so that his face is towards the place he leapt from. When some practice has given confidence, he may proceed to the high leap with the stand. At first the learner may quit the pole, by giving it a slight push from him, and afterwards he may carry it over the cord with him, but this is more difficult.

THE LONG LEAP WITH THE POLE.

This is performed like the last as regards the spring, and the handling of the pole, and may be practised across the trench dug as was directed for the long leap without the pole.

THE DEEP LEAP WITH THE POLE.

Plate XVII. This requires strength

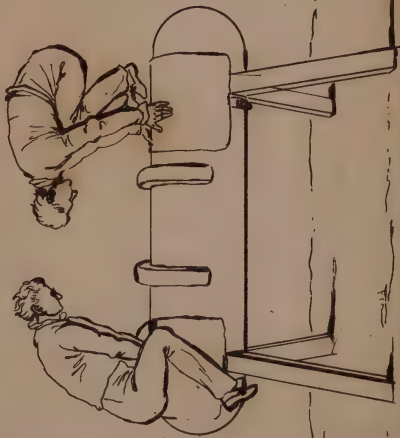
in the arms and hands together, with some knowledge of balancing, as indeed do all the exercises with the pole. The performer places the pole in the depth he means to descend, and lowers himself to the position represented in the plate. He then quits the height with his feet, and swinging round the pole, descends on the balls of the toes with his face toward the place he descended from.

Plate XVII.



The Deep Leap.





VAULTING.

The vaulting horse, *Plate XVIII.* is a cylinder of wood rounded at both ends and firmly supported by four legs. Towards the centre, but leaving space between them for the body of an ordinary person, are two ridges, the space between which is called the saddle. Leather well wadded with wool may be buckled round the horse at any part, according to the exercises to be performed.

Fig. 1, is the manner of leaping on the horse, and is performed by first placing the hands on it, and then springing to the position shewn in the plate.

In *fig. 2*, the body is raised upon the hands until the feet are enabled to take a standing position on the

horse, then the hands may be placed on the further ridge, and the performer descends into the saddle in a riding position.

VAULTING INTO THE SADDLE.

Plate XIX. This may be performed either with or without a run; the hands are placed on one of the ridges, and at the same time a spring is made, and the body turned on one side, so that only one leg passes over the horse, and the performer descends into the saddle, in the manner represented in the Plate.

VAULTING SIDE-WAYS.

Plate XX. The hands are placed as above, a spring is made, and at the same instant that the feet pass over the horse, one hand leaves its



Plate III.



Side Vaulting.





Plate XXI.



Vaulting on or over the Saddle.

hold, as represented in the Plate, and on the other side the performer descends upon his toes. This may be performed from either side.

VAULTING ON, OR OVER, THE SADDLE.

Plate XXI. The hands take hold of each ridge, and the spring is made between them, so as to rest on the saddle or go over it.

THE CLIMBING STAND.

Plate XXII. fig. 1, is the plan of a grand climbing stand ; *fig. 2*, is a more simple one ; and *fig. 3*, another still less complicated.

In the grand stand, *fig. 1*, *a, a*, are two strong beams which support another *b*, firmly fixed to which, is the mast *c*.

e is a cap of iron, from which descend two rods of the same *ff*, to support the platform, *d* ;

l, l, are two ladders ;

m is the slant rope ;

n is the plank ;

At the two upper corners of which are strong rings of iron, through them pass two rods of iron, that project from the beam *a* ; by this means we are enabled to have the plank in

Fig. 2.



Fig. 1.

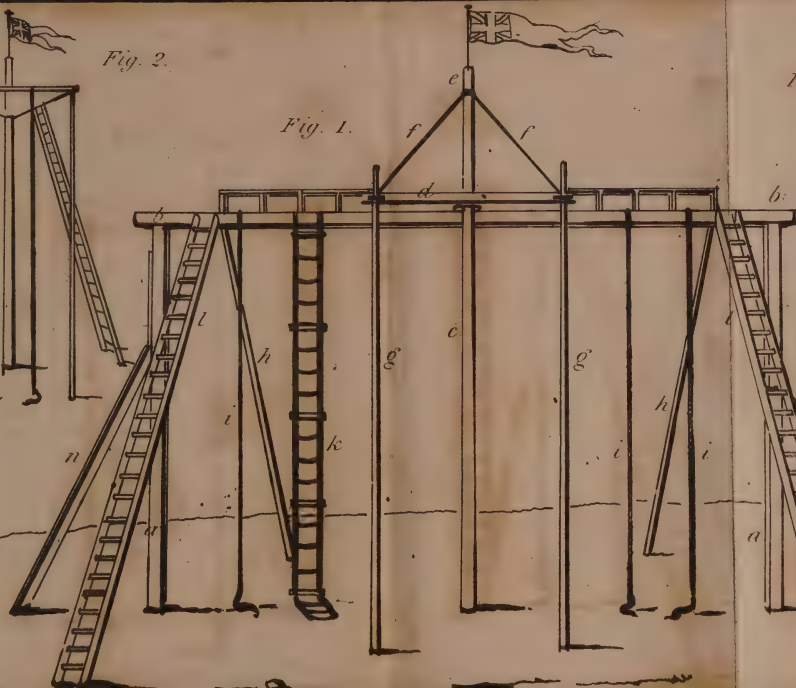


Fig. 3.



Climbing Stands.

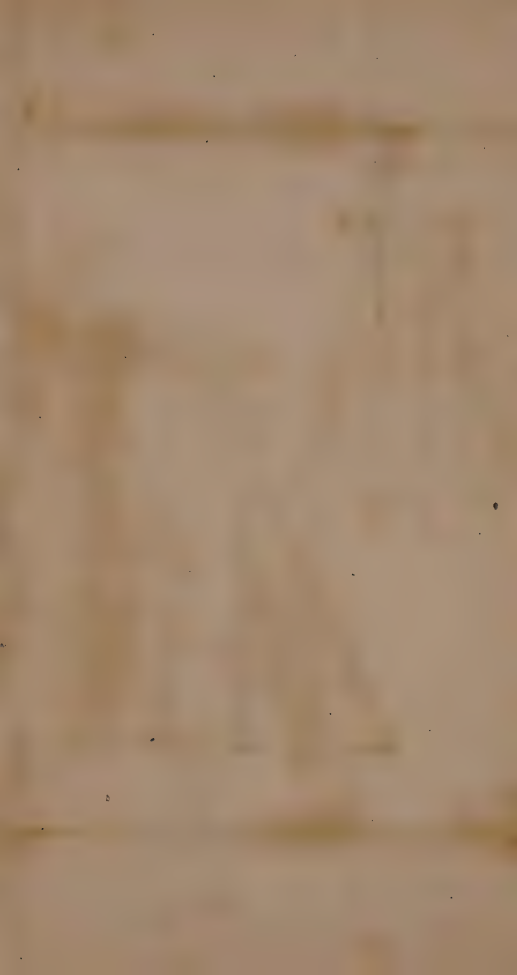


Plate XXIII.



Climbing the rope.

Plate XXIV.



Sailors manner of climbing.

various degrees of obliquity according to the ability of the performer ;

h, h, are slant poles ;

e, e, upright ones ;

i, i, i, are three perpendicular ropes ;

k, is a rope ladder.

The parts that compose figs. 1 and 2 will be evident from the description of fig. 1.

CLIMBING THE ROPE, as in *Plate XXIII.*

The rope descending from the hands passes between, and is held firm by the feet, the hands are moved alternately one above the other, and the feet drawn up between every movement of the hands.

SAILORS' MANNER.

Plate XXIV. The rope from the

hands passes between the thighs, twists round the leg below the knee, and over one instep; the other foot presses upon the rope, by which a very firm support is obtained.

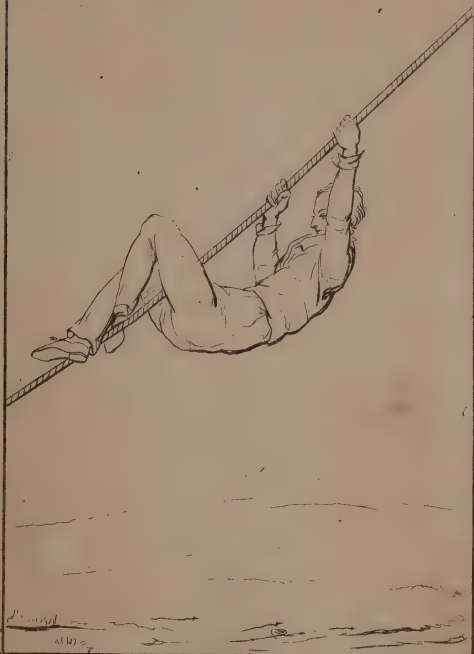
In descending the rope do not slide down, but move first one hand then the other, as the friction in sliding down would blister the hands.

The slant rope may be climbed in either of the above ways, but the best is as follows, and is represented in *Plate XXV*. The sole of one foot is to be laid flat on the rope, and over the instep of that foot the other leg is to be laid.

CLIMBING THE PERPENDICULAR, OR
SLANT, POLE.

Plate XXVI. The legs and hands are to be moved alternately, but the

Plate XXV.



Climbing the slant rope.

Plate XXVI.



Climbing the Pole.

Plate XXVII.



Descending the Pole.

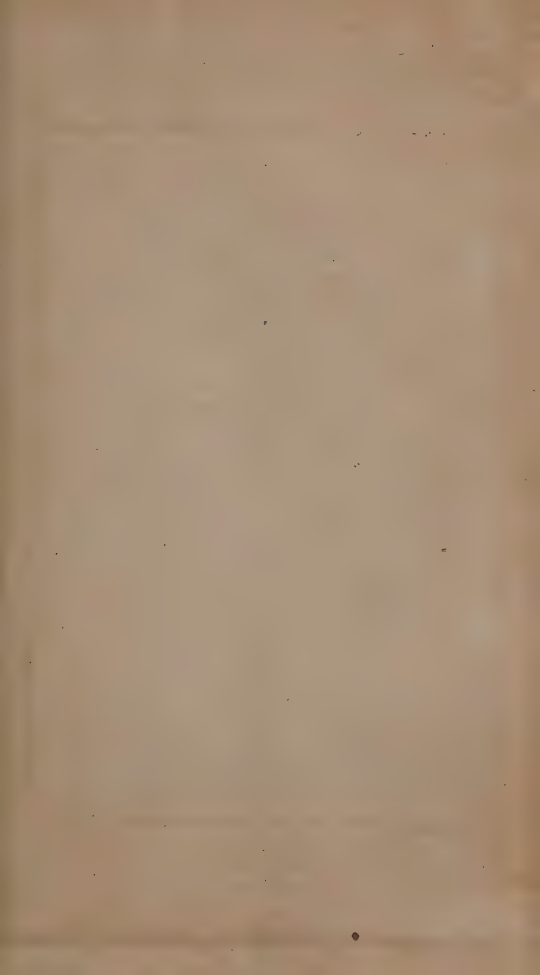


Plate XXVIII.



*Climbing the Ladder
by the two sides.*

hands are not moved over each other as in climbing the rope.

DESCENDING THE POLE.

Plate XXVII. The hands are taken from the pole, but held in a guarded manner on each side of it, and, the legs slightly released, the body slides gently down the pole.

The rope and likewise the pole may now be ascended by the hands only, but the slant rope will be found the easiest to begin with.

THE LADDER.

The learner is to take hold by each side of the ladder as in *Plate XXVIII.* and moving the hands alternately, ascends as far as his strength will allow.

CLIMBING THE LADDER BY THE
RUNDELS.

Plate XXIX. In this the learner should endeavour to bring the elbow of the lower arm down firmly to the ribs, before he pulls himself up to the next.

CLIMBING THE LADDER BY ONE SIDE.

Plate XXX. The hands are moved alternately in these three exercises; the legs should be kept closed and as steady as possible.

CLIMBING THE PLANK.

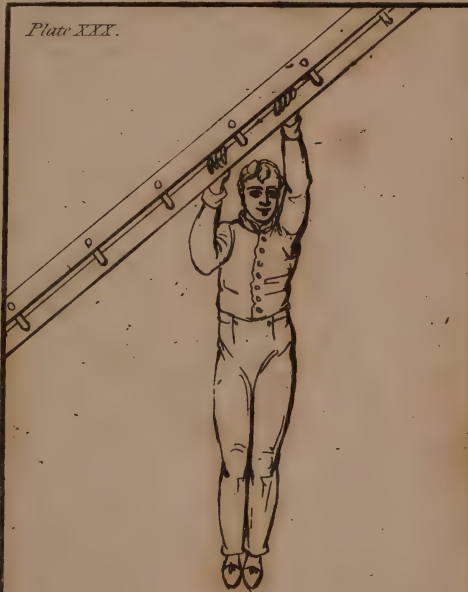
Plate XXXI. The plank should be about two feet broad, and two inches thick; the hands are to be placed on each side of the board, and the feet flat upon the same. In coming down, small quick movements are made.

Plate XLIX.



*Climbing the Ladder
by the rungs.*

Plate XXX.



*Climbing the Ladder
by one side.*

Plate XXXI.

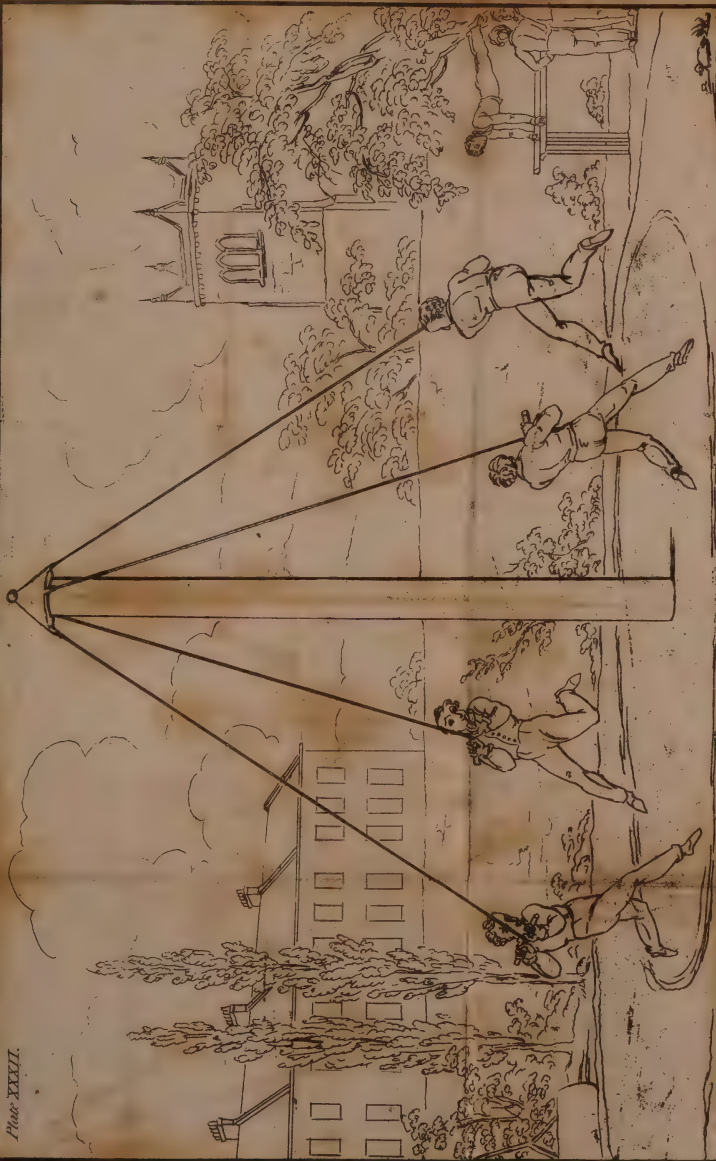


Climbing the Plank.

with the feet and hands. The board may be elevated from thirty-five to fifty degrees of declivity, according to the power or practice of the performer.

FLYING STEPS, OR GIANT'S STRIDES.

Plate XXXI. This is a delightful exercise, and very beneficial and improving. A mast or beam is to be firmly secured in the ground; and at its top is a strong iron cap that freely moves, in a circular horizontal direction. To this cap are appended four ropes, and to these are affixed short bars of wood. The performers take hold of these bars, and vault in a circle, gradually increasing their speed, and bearing their weight upon the rope. When in full speed, they touch the ground only at intervals with their toes. Some spring up with their knees to their chest, and are thus carried round for some time.



Flying Step on the Giant's Stride.



CALISTHENICS,
OR
LADIES GYMNASTICS.

CALISTHENICS are a valuable extension of Gymnastic exercises to females; and their importance has led to their eager adoption in the principal ladies' schools, in and around London. The INTERROGATIVE SYSTEM of instruction addresses itself efficiently to the improvement of the MIND, by vigorous and impressive intellectual exercises, while Calisthenic exercises add equally to the health, vigour, grace, ease, and ele-

gance of the BODY; and the union of both systems, in the improvement of the *mind* and the *body*, constitutes a perfect system of education.

The metropolitan schools now adopt both systems, at least all those who are distinguished by the good intelligence of their scholastic course, or those wherein reason and practice keep pace with the general improvements of the age.

In truth, none condemn Calisthenics for ladies, but those who, by a false association of ideas, connect these select exercises with the more athletic ones adopted in teaching boys. They are, however, so varied, as to suit the gentler manners of the sex, and it is found that they confer a grace and ease of action, never before acquired, while they improve the

health of the pupils, and add surprisingly to the vigour of their constitutions, tending also to remove all deformities, increase growth, and confer symmetry of form.

The want of bodily exercises for young ladies, especially in schools, has long been felt and lamented. Dancing has been a resource, but it calls only certain muscles into action, and though beneficial, as far as it goes, yet its continued repetition renders it dull and monotonous.

Exercises, on the contrary, founded on system, directed to a useful end, varied from ordinary pursuits, and conferring agility on the limbs, grace on the general movements, and strength on the animal economy at large, are therefore valuable, desirable, and above the necessity of praise.

London has professors of all kinds, and both males and females teach Calisthenics in the metropolitan schools. In the provinces, the dancing-master is the best professor of this art; but any agile teacher may, by means of these instructions, introduce it with effect. In a short time we may, however, expect to hear of professors of Gymnastics and Calisthenics, at least, in every county town.

CALISTHENIC EXERCISES.

The three positions in *Plate I.* may be adopted by young ladies, and practised till they are perfect.

The long leap, *Plate III.* may be performed to a moderate extent.

The high leap, *Plate IV.* may also be performed to a moderate height.

The three first positions on the horizontal bar, *Plate X.* should also be practised by young ladies—these and many others, described in the *Gymnastics*, may be performed by the ladies to such an extent as the teacher approves.

CIRCULAR MOVEMENT OF THE ARMS.

Plate XXXII. fig. 1. In this exercise, one arm, at first hanging by the side, is moved backward; it then passes up by the ear, and is brought down in front. The hand, which is kept folded, thus describes a circle from the shoulder.

This is first to be done with one arm, then with the other, and lastly, with both together, slowly, steadily, and swiftly.

POINTING TO THE GROUND.

Fig. 2. Plate XXXII. The hands are first raised above the head, and then decline forward, the body bending, and the performer points the hands as low towards the ground as possible, but without bending the legs.

THE SPECTRE MARCH.

Plate XXXIII. fig. 1. The hands are to be placed on the hips, the thumbs turned back, and the performers, raising themselves on their toes, are then to move forward by a rapid succession of very small springs, keeping the whole frame as erect as possible.

THE DANCING STEP.

Fig. 2. The hands should be placed as above. A small hop is then to be



Circular motion of the arm. The bend forwards.



Plate XXXIV.



Spectre march.

Dancing step.

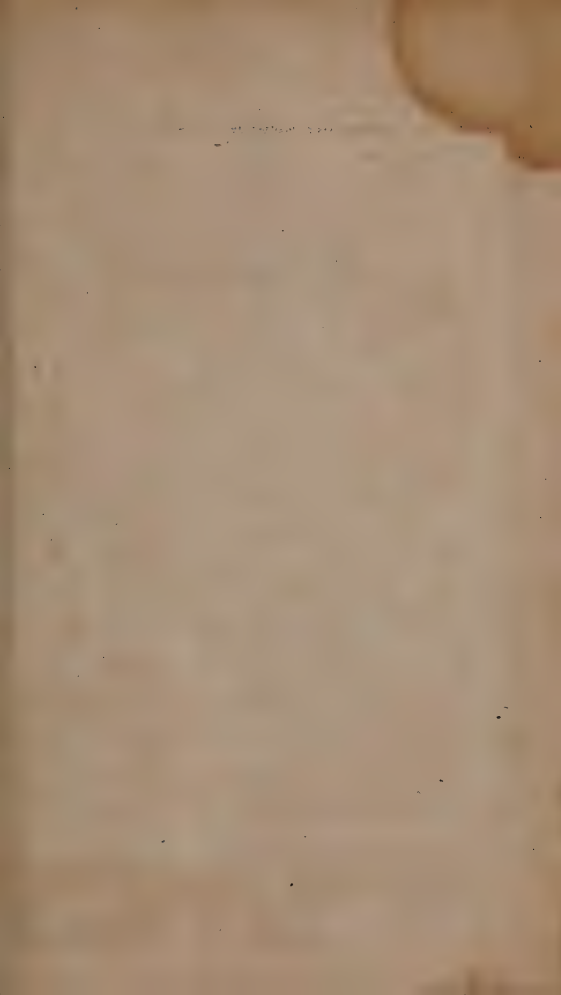


Plate XXXV.



made on the toes, with one foot, the other stepping forward and repeating the hop; and the performer thus moves forward, by a step and a hop, with each foot alternately.

EXERCISES WITH THE WAND.

Plate XXXIV. The wand for this purpose should be light and smooth, but not of a nature to bend. It is first to be taken hold of near the extremity, by each hand, with the knuckles outward, as shewn in *fig. 1*; then raised to the perpendicular position of *fig. 2*, the right hand being uppermost. The left then takes its place: this should be performed rapidly for some time.

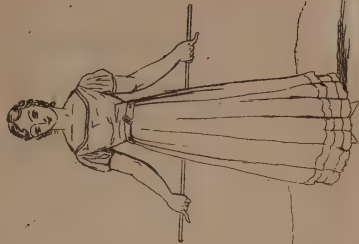
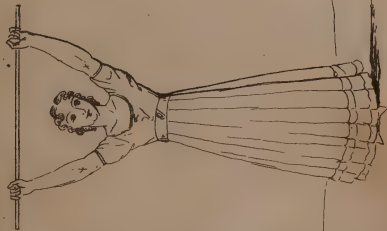
Plate XXXV. From the position *fig. 1. Plate XXXIV.*, the wand is to be raised above the head as shewn in

fig. 1. Plate XXXV. ; it is then to be passed behind, as in *fig. 2*, and finally returned into the first position of the wand, by a reverse progress of the arms.

Plate XXXVI. The wand is to be held as before, except that the knuckles are turned behind; it is then (see *fig. 2.*) to be raised parallel with the shoulders, each hand being turned alternately inward, so that the end of the wand passes between the fore arm and the shoulder.

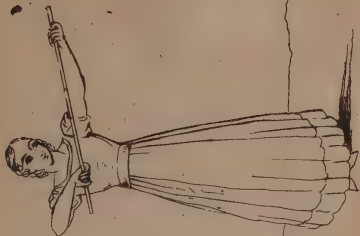
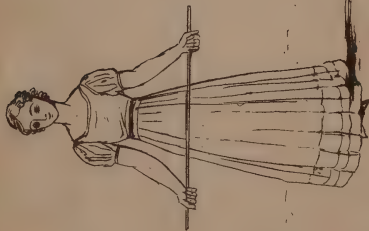
It is then to be lifted above the head, as in *fig. 1, Plate XXXVII.*, and brought down behind as at *fig. 2.* It is finally returned to the position *fig. 1, Plate XXXVI.* These exercises should be repeated many times, till the pupil is very expert and rapid.

Plate XXXVI.



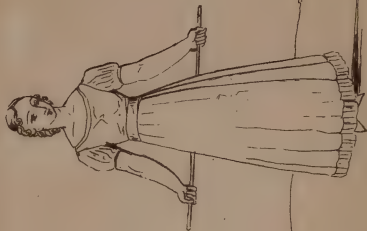
Wand Exercises.

Place XXXVII.



Wand Exercises.

Plate XXXVIII.



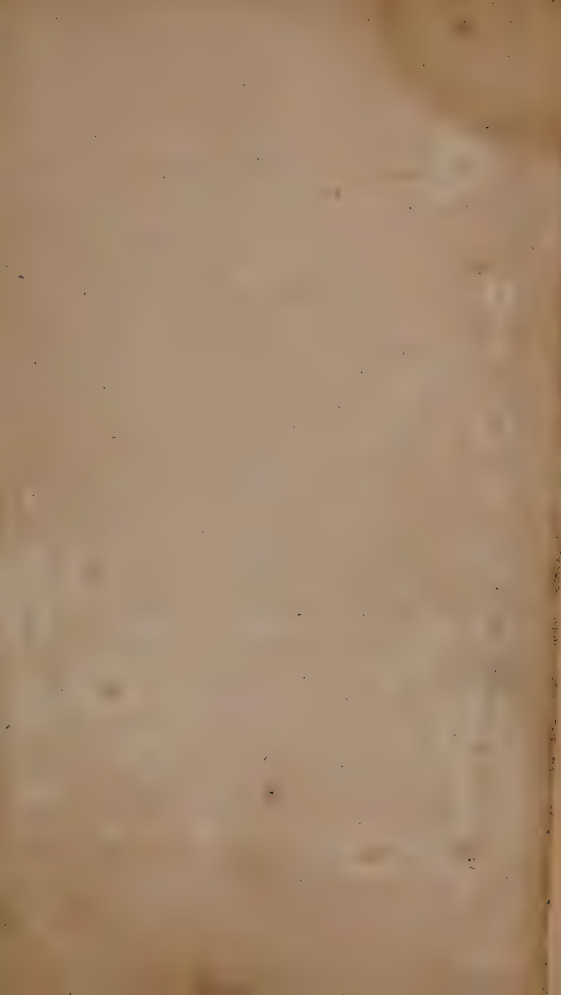


Plate XXXIX.



Horizontal Bar.

Plate XXXVIII. The performer, taking hold of the horizontal bar, swings backward and forward until the swing is sufficient to admit of taking the hands from the bar, each time of swinging backward from it, and catching it again; but the bar should be relinquished only when in the position described above.

THE TRIANGLE.

This is a bar of wood supported at each end by a cord. The two cords meet together at some distance above, and, uniting, pass over a pulley, so that it may be fastened at any height to suit the performer. For the following exercises, the bar should be about the height of the knees.

First, for the circle, the bar is held as in *Plate XXXIX*.

The performer then steps round on the toes, gradually increasing in velocity and bearing more on the bar.

STOOPING FORWARD.

Plate XL. The bar hanging in its natural position, the hands are placed upon it, and the body lowered forward, so that the whole weight rests upon the hands and the toes, but one foot may be brought a little forward.

BENDING BACKWARD.

Plate XLI. From the above position the bar is drawn inwardly, the feet retain their position, and, holding firm by the bar, the body reclines backward to the position shewn in the plate.

Plate XL.



Triangle Exercise 1st



Plate XLI.



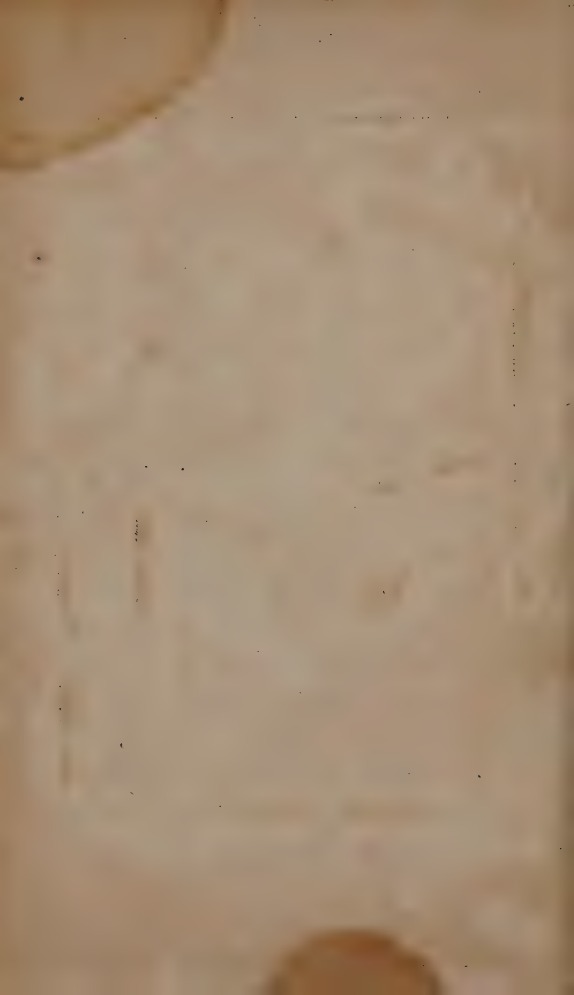
Triangle Exercise 2nd



Plate XLII.



Triangle Exercise 3rd



These exercises will bring all the muscles into play, and those performed by boys may, to any agreeable extent, be superadded, particularly the GIANT'S STEPS, described in *Plate XXXI.*, for which an upright mast with its appendages should be provided.

In most of these exercises, young ladies make as rapid progress as boys, and the writer has seen some who have acquired as great an agility as any boys of their age. The climbing exercises are generally omitted in the female course, while vaulting, leaping, &c., are more limited than for boys.

SWIMMING.

Boys should learn to swim in water not deeper than their breasts. No advantage is gained by deeper water, while all the dangers are avoided.

The entire secret of floating upon water consists in keeping no more of the body out of the water than the difference between the specific gravity of the whole body and the greater weight of an equal bulk of water.

This difference is about equal to the bulk of the head ; hence, if the hands are held out of the water, their weight is sufficient to sink the body without some resisting action of the feet. Animals therefore in general are able to swim, because they are unable to lift their fore legs over their heads ; while inexperienced men are

generally drowned owing to their being able to raise their arms over their heads, as in the act of catching for relief. It is from the same cause that a boat of wood sinks when there is a hole in the bottom ; the parts out of the water pushing down the parts in the water.

In regard to the movements in swimming, they can only be learnt by seeing swimmers, &c., and imitating their motions till perfect in each of them. No drawing or description can convey a competent notion either of the motions or the effects of them.

A good assistance in learning the motions is a suspension cord fastened to a beam, and fixed round the body. Corks and bladders are of little use.

OF THE MUSCLES OF THE HUMAN
BODY.

The animal body consists of a framework of BONES for strength, of NERVES for sensation, of ARTERIES and VEINS for circulation, and of MUSCLES for motion.

The muscles alone are concerned in gymnastic exercises, and chiefly those of the limbs.

Muscles are collections of fleshy fibres, of a bright red colour, which are capable of being contracted or relaxed at pleasure. At each end they are fastened to the bone by white firm fibres, called tendons. So that, when a muscle is shortened by swelling in the middle, the tendon draws up the bone or limb. In this swelling or contracting consists the action and power

of the muscles, and all the motions of the limbs and body.

At the same time, the power of the muscles is entirely borrowed or reflected, as it were ; for in lifting they form a series from one part of the body to another, and one extremity bears on the ground while the other is exerted on the object. Vigour and strength depend on this power of making the muscles continuous, from the ground to the object ; for if a man is balanced in a pair of scales, and a hundred weight be put into his arms, and sustained by them, the power of the muscles will not diminish the weight, but passing as it were through the feet, the entire hundred weight will be added to the weight of the scale in which he stands.

But the muscles among each other,

when opposed by *antagonist* muscles, derive powers from their own opposing action ; for a man might squeeze any thing put into his hand, or he might exert great energy with the muscles of his jaw-bones, without adding to his weight or action against the ground, his strength in these instances being derived from the energy of the moving gas fixed by respiration in the lungs.

There are therefore two sources of muscular energy ; first, that which is derived from the reaction of the muscular system against the ground, and that which is derived from the opposing energy of antagonist muscles, in which, with reference to the entire system, power is gained and lost, the energy itself arising from gas—fixing by the lungs.

The muscles called into action by gymnastic exercises, are those of the UPPER PART of THE arm, or OS HUMERI, containing FOUR.

The LOWER ARM to the wrist contains no less than thirteen.

The HAND, TEN.

The THIGH, NINE.

The LEG, SIX.

The FOOT, TEN.

So that, in the mere motions of the limbs, no less than fifty-two separate muscles are brought into exertion and action, while those in the entire frame are between four and five hundred in number.

A muscle acts only by contraction. Its force is exerted in no other way. When the exertion ceases, it relaxes itself, that is, it returns by relaxation to its former state; and is without

energy. This is the nature of the muscular fibre ; and being so, it is evident that the reprocral *energetic* motion of the limbs, by which we mean motion *with force* in opposite directions, can only be produced by the instrumentality of opposite or antagonist muscles ; of flexors and extensors answering to each other.

The action of the muscles is often wanted, where their situation would be inconvenient. In which case, the body of the muscle is placed in some commodious position at a distance, and made to communicate with the point of action, by slender strings or tendons. If the muscles, which move the fingers, had been placed in the palm or back of the hand, they would have swelled that part to an awkward and clumsy thickness, and the beauty,

the proportions of the part, would have been destroyed. They are therefore disposed in the arm, and even up to the elbow ; and act by long tendons, strapped down at the wrist, and passing under the ligaments to the fingers, and to the joints of the fingers, which they are severally to move. In like manner, the muscles which move the toes, and many of the joints of the foot, are gracefully disposed in the calf of the leg, instead of forming an unwieldy tumefaction in the foot itself.

Nothing in short can be, or is, more wonderful than the curious mechanism of the muscles, and nothing more displays the powers and variety of action, than gymnastic exercises when carried to all the perfection of which they are susceptible.

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